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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of

Yang-lim CHOI, et al.

Docket No: Q61834

Appln. No.: 09/916,210

Group Art Unit: 2613

Confirmation No.: 6848

Examiner: AN, SHAWN S.

Filed: July 27, 2001

For: OBJECT ACTIVITY MODELING METHOD

SUPPLEMENTAL APPEAL BRIEF UNDER 37 C.F.R. § 41.37

MAIL STOP APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Notification of Non-Compliant Appeal Brief dated August 29, 2006,

Appellants submit this Supplemental Appeal Brief:

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I. REAL PARTY IN INTEREST

Based on the information supplied by the Appellant, and to the best of Appellant's legal representative's knowledge, the real party in the interest is the assignee, SAMSUNG ELECTRONICS CO., LTD and the Regents of the University of California.

II. RELATED APPEALS AND INTERFERENCES

To the best knowledge and belief of Appellant, the Assignee and the undersigned attorney, there are no other appeals or interferences before the Board of Appeals and Interferences ("the Board") that will directly affect or be affected by the Board's decision in the present Appeal.

III. STATUS OF CLAIMS

Claims 1-8 are cancelled.

Claims 9-11 are all the claims pending in the application. Claims 9 and 10 have been finally rejected, and are the subject of this appeal. Claim 11 would be allowable if rewritten in independent form, and Appellant submitted with the Appeal Brief filed on August 14, 2006, an Amendment rewriting claim 11 in independent form. After amendment, claim 11 is as follows:

11. (previously presented): An object activity recognition method comprising the steps of:

(a) obtaining feature vectors by motion estimation for video frames;

(b) determining a state, to which each frame belongs, using the obtained feature vectors; and

(c) determining an activity model, which maximizes the probability between activity models and a video frame provided from a given activity model dictionary using a transition matrix for the determined state, as the recognized activity, wherein the step (c) comprises a step of finding an activity model, which maximizes probability $P(O|\lambda)$ from the given activity model dictionary $\{\lambda_1, \lambda_2, ..., \lambda_E\}$, when T is a positive integer indicating the number of frames forming the video sequence, $Z_1, Z_2, ..., Z_T$ are feature vectors of first frame, second frame, ..., T-th frame, respectively, and if video frame $O=\{Z_1, Z_2, ..., Z_T\}$ is given and E is the number of state models, and wherein the transition matrix is obtained by using an expectation-maximization (EM) algorithm based on the observation symbol probability $\{b_j(.)\}$ corresponding to scene j in the training process.

IV. STATUS OF AMENDMENTS

No amendments have been made subsequent to the Final Office Action dated October 12, 2005. However, Appellant submits with this Appeal Brief, an Amendment which rewrites allowable claim 11 in independent form.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

An aspect of the invention provides an object activity recognition method. Referring to Fig. 3, an aspect of the invention obtains feature vectors by motion estimation for video frames (Fig. 3, S304), determines a state to which each frame belongs using the obtained feature vectors (Fig. 3, S306), and determines an activity model, which maximizes the probability between activity models and a video frame provided from a given activity model dictionary using a transition matrix for the determined state, as the recognized activity (Fig. 3, S308).

Claim 9 recites:

> An object activity recognition method *(see, e.g., page 1, lines 2-6)* comprising the steps of:
>
> (a) obtaining feature vectors by motion estimation for video frames *(see, e.g., page 14, lines 7-10; Fig. 3, element 304)*;
>
> (b) determining a state, to which each frame belongs, using the obtained feature vectors *(see, e.g., page 14, lines 11-12; Fig 3, element 306)*; and
>
> (c) determining an activity model, which maximizes the probability between activity models and a video frame provided from a given activity model dictionary using a transition

matrix for the determined state, as the recognized activity *(see, e.g., page 14, lines 12-19; Fig. 3, element 308)*.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 9 and 10 are rejected under 35 U.S.C. § 103 as being unpatentable over Martens et al (U.S. Patent No. 6,157,677) in view of Hu (U.S. Patent No. 5,748,247).

VII. ARGUMENT

A. Rejection of claims 9 and 10 under 35 U.S.C. § 103 as being unpatentable over Martens et al (U.S. Patent No. 6,157,677) in view of Hu (U.S. Patent No. 5,748,247).

Appellant respectfully submits that claim 9 is patentable over the applied references at least because the references commonly fail to teach or suggest "determining an activity model, which maximizes the probability between activity models and a video frame provided from a given activity model dictionary using a transition matrix for the determined state, as the recognized activity", and at least for this reason fail to render obvious the invention defined by claim 9.

In the Office Actions dated April 20, 2005 and October 12, 2005, and the Advisory Action dated January 31, 2006, the Examiner refers to portions of Martens et al as disclosing each of the claimed features, except that he admits that Martens et al does not specifically disclose determining an activity model, which maximizes the probability between activity models and the video frame. The Examiner, however, states that Hu teaches refinement of motion vectors, and that an activity model has been used to maximize the probability that the derived motion vector field represents the truth as a commotion (recognized activity). The Examiner cites column 2, lines 33-38 of Hu as teaching this feature. (October 12, 2005 Office Action, 7th paragraph of page 2; see, also the Advisory Action of January 31, 2006.)

Appellant respectfully submits that the applied references, taken either alone or in combination, fail to teach or suggest the step (c) of claim 9, and at least for this reason fail to render obvious the invention defined by claim 9.

In more detail, Appellant submits that Martens et al does not teach or suggest maximizing, or even enhancing, the probability between activity models and a video frame provided from a given activity model dictionary.

The Examiner cites col. 3, lines 10-19, col. 4, lines 39-45, col. 11, lines 41-48, col. 13, lines 66-67, and col. 14, lines 1-9 of Martens as teaching using a transition matrix from the determined state as the recognized activity from an activity model dictionary (5th paragraph of page 2 of the Office Action dated October 12, 2005). Appellant respectfully submits that the portions of Martens cited by the Examiner, however, merely teach using a model to enhance motion estimation. There is no teaching or suggestion of determining an activity model which maximizes the probability between activity models and a video frame provided from a given video model dictionary using a transition matrix for the determined state, as the recognized activity. Also, Martens does not teach or suggest determining an activity model as a recognized activity.

The Examiner refers to the Martens et al Abstract, column 13, lines 59-67 and column 14, lines 1-12, as teaching determining an activity model which enhances the probability between activity models and video frame using a transition matrix for the determined state, as a recognized activity. These portions of Martens et al, however, do not teach or suggest anything with respect to the claimed feature of the given activity model dictionary. Martens et al does not teach or suggest maximizing, or even enhancing, the probability between activity models and a video frame provided from a given activity model dictionary. The portions of Martens et al cited by the Examiner relate to correcting for systematic intensity changes that would otherwise

impede the motion estimation so that the probability of erroneously modeling motion effects in the intensity domain is minimized. There is no teaching or suggestion of maximizing or enhancing the probability between activity models and a video frame provided from a given activity model dictionary using a transition matrix for the determined state.

Furthermore, even if it were to be conceded, for the sake of argument, that Martens does teach what the Examiner alleges Martens teaches, which Appellant believes it does not, the combination proposed by the Examiner would still not render the claimed invention obvious. In more detail, the Examiner states that Martens teaches that classification probability can enhance motion estimation and modeling, and that Hu teaches refinement of motion vectors and that an activity (Gibbs/Markov) model has been used to maximize the probability that the derived motion vector field represents the true physical motion (recognized activity) (Office Action, page 2, paragraphs 6-7). But Hu merely teaches using a model to maximize the probability that the derived motion vector field represents the true physical motion. This teaches nothing about determining an activity model as a recognized activity; it merely teaches using one model to maximize the probability of obtaining an accurate motion vector field. Therefore, Appellant respectfully disagrees with the Examiner's statement that Hu teaches "maximizing the probability between activity models and the video frame" (October 12, 2005 Office Action, page 2, second from last line).

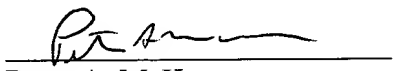
For at least the above reasons and the reasons presented in the previously filed Responses, Appellant submits that claim 9 and its dependent claim 10 are not rendered obvious by the applied references. Appellant therefore requests that the rejection of claims 9 and 10

under 35 U.S.C. § 103 as being unpatentable over Martens et al (U.S. Patent No. 6,157,677) in view of Hu (U.S. Patent No. 5,748,247) be withdrawn.

Unless a check is submitted herewith for the fee required under 37 C.F.R. §41.37(a) and 1.17(c), please charge said fee to Deposit Account No. 19-4880.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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CLAIMS APPENDIX

CLAIMS ON APPEAL:

Claims 1-8 (canceled).

9. An object activity recognition method comprising the steps of:

(a) obtaining feature vectors by motion estimation for video frames;

(b) determining a state, to which each frame belongs, using the obtained feature vectors; and

(c) determining an activity model, which maximizes the probability between activity models and a video frame provided from a given activity model dictionary using a transition matrix for the determined state, as the recognized activity.

10. The object activity recognition method of claim 9, wherein the step (c) comprises a step of finding an activity model, which maximizes probability $P(O|\lambda)$ from the given activity model dictionary $\{\lambda_1, \lambda_2, ..., \lambda_E\}$, when T is a positive integer indicating the number of frames forming the video sequence, $Z_1, Z_2, ..., Z_T$ are feature vectors of first frame, second frame, ..., T-th frame, respectively, and if video frame $O=\{Z_1, Z_2, ..., Z_T\}$ is given and E is the number of state models.

EVIDENCE APPENDIX:

NONE

RELATED PROCEEDINGS APPENDIX

NONE